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Department of Entomology of the University of Kansas.

HISTORICAL ACCOUNT.

BY S. J. HUNTER.

THIS, the second entomology number of this Journal, is introduced by an account and bibliography of the work of the department of entomology of the University of Kansas. The volume itself is intended as a tribute, in a small measure, to the work of the founder of the department.* Doctor Snow, a member of the faculty of the University of Kansas from the foundation of the University, was for many years professor of natural history, and his impress, especially on the museum side, on so many branches of this subject, is such that those who are now going over his work marvel at the wonderful capacity of the man. He was, as well, a great, desirable teacher. Entomology is very early shown to have been his favorite branch. It is especially fitting that the accomplishments in his favorite work should be recorded, and it seems best to present these chronologically.

The scope and activity of the department of entomology of the University of Kansas is therefore probably best shown by a transcript from the records of the department giving the work accomplished and official publications issued.

* It is regretted by the author that the arrangement under which this Journal is now published is such that prolonged delays sometimes prevent its regular appearance. But for this reason this issue would have appeared at a much earlier date.

1866.—FRANK H. SNOW, Professor of Mathematics and Natural Sciences.

In the senior year of the college instruction was given in zoölogy, and the principal branch of the subject treated was the insect fauna of the state.

This course was continued until 1886, when there began to be given special courses devoted exclusively to the subject of entomology.

1867.—Doctor Snow relinquishes mathematics and becomes professor of natural history.

1872.—Dr. F. H. Snow, of the University, was appointed chairman of the entomological commission of the Kansas Academy of Science, and was continued in this position for many years.

1874.—Doctor Snow begins publication of entomological papers in Transactions of Kansas Academy of Science.

1875.—An account of the Rocky Mountain locust, published in the Transactions of the Kansas Academy of Science. The same year Doctor Snow published a paper on a moth of economic importance, in the same Transactions. Another paper of this same year, which clearly shows the scope of the departmental work, is "The best means of defense against the insect enemies of the horticulturist," also published in the Transactions of the Kansas Academy of Science.

Mr. George F. Gaumer, an assistant, issued a publication on the larvæ of certain insects.

1876.—A publication by Doctor Snow from the University, entitled "List of Coleoptera collected in Colorado."—Trans. Kan. Acad. Sci.

Another paper, which dealt largely with the relation of birds and insects to agriculture, was issued this same year.

1877.—A publication appeared in the Transactions of Kansas Academy of Science, giving a list of the insects of Wallace county, Kansas. Two other papers the same year in the Transactions of the Kansas Academy of Science gave an account of a large tiger beetle of unusual scientific importance.

1880.—Appears a discussion by Doctor Snow on the webworm.

1882.—An account of the house fly is published in *Psyche*, III.

1883.—Was a year of unusual activity among injurious insects, and we find four papers of rather wide scope, on three noxious insects; on three injurious insects; on the habits of the screw worm; and on how to destroy these injurious insects. These were published in the first and second reports of the Kansas State Board of Agriculture and in *Psyche*.

1884.—We find another year of activity, as is shown by the publications in the reports of the Kansas State Board of Agriculture, on insects injurious to wheat and on the value of several insecticides.

1885.—This was an even more active year among insects injurious to crops. At this time there appeared in the Kansas State Board of

Agriculture reports a paper on injurious insects from July to September; on the chinch bug; on pear blight; and on further injurious insects—the Hessian fly, the wheat-straw worm, and the webworm.

1886.—This year the department begins to offer specially advanced courses in entomology.

1887.—There appeared in *Science* an article on the purslane worm.

1888.—This year began extended work of investigation with the chinch bug; an account of it is given in the report of the Kansas State Board of Agriculture. Another paper on insects injurious to wheat appeared in this same report.

1889.—Work had developed so that a number of departments were established. Doctor Snow now professor of botany, entomology and meteorology.

Further reports on the chinch bug were issued in the Board of Agricultural reports; and one on the experiments for the artificial dissemination of a contagious disease among chinch bugs was published in the Transactions of the Kansas Academy of Science.

V. L. Kellogg, assistant professor in the department of entomology, published some notes on bird lice, in the Transactions of the Kansas Academy of Science.

1890.—Doctor Snow becomes chancellor of the University.

Two reports on the experiments for the artificial destruction of the chinch bug were published in the reports, and one on the general question of the chinch bug.

1891.—This year House bill No. 639 was passed, "An act to establish an Experimental Station at the State University of Kansas, to promote and conduct experiments for the destruction of chinch bugs by contagion or infection, and making appropriation therefor."

Director of the Experiment Station of the University of Kansas was created, and Doctor Snow was elected to this position.

Papers on insects injuring Kansas wheat, on the results of the experiments carried on, and on the contagious diseases of the chinch bug were published in the State Board report, in *Insect Life*, and in the first annual report of the Experiment Station of the University of Kansas.

1892.—J. M. Aldrich, a graduate student in the department, published six papers on Diptera.

Three more papers on the chinch bug and its contagious diseases appeared, one in the second annual report of the Experiment Station, another in *Insect Life*, and the third in the report of the Kansas State Board of Agriculture.

With the assistance of V. L. Kellogg, Doctor Snow published a paper on two grain insects, in the bulletin of the department of entomology of the University of Kansas. Later the same year Doctor Snow published another article on the chinch bug in *Psyche*.

Assistant Professor V. L. Kellogg published two articles—notes on the comparative anatomy of insects; two on insects injurious to drugs;

insect notes, in Transactions of the Kansas Academy of Science; a 117-page bulletin—an account of common injurious insects of Kansas; and assisted Doctor Snow with his bulletin on two grain insects.

1893.—Doctor Snow published another report of the diseases of the chinch bug, in the third annual report of the Experiment Station of the University of Kansas.

Mr. Kellogg published a paper on the horn fly of cattle, with Doctor Snow, in the bulletin of the department of entomology. He also published a paper on the destruction of insects by fungi.

In this year W. A. Snow succeeded to the position of assistant professor, and Mr. Kellogg became head of the department of entomology at Leland Stanford University.

1894.—Doctor Snow published his fourth annual report of the Experiment Station, giving an account of his work with the chinch bug for that year. He also gave, in *Insect Life*, an account of the work in economic entomology at Kansas University for the season of 1894.

Some further papers of Kellogg's were published—two more articles on insects injuring drugs, one on the anatomy of insects, and one on European experiments with insect diseases.

Mr. Hugo Kahl was appointed systematic entomologist, assistant in Entomological Museum.

1896.—A further report by Doctor Snow on the contagious diseases of the chinch bug, in the sixth annual report of the University Experiment Station.

S. J. Hunter published some notes on injurious insects, in Transactions of Kansas Academy of Science.

Mr. Hunter, who became assistant professor at this time, went to the western part of the state, where he began a special study of the grasshopper problem.

At request of Kansas nurserymen, S. J. Hunter began the annual inspection of Kansas nurseries.

Mr. Kahl, systematic entomologist, and curator of entomological collections.

1897.—Doctor Snow, together with S. J. Hunter, published a bulletin on the more destructive grasshoppers of Kansas. Disking of alfalfa first advocated, now a valuable practice.

1898.—Doctor Snow's title now becomes professor of organic evolution and entomology.

Mr. Hunter published a bulletin on scale insects injurious to orchards. Two papers by Hunter appeared in *Psyche;* they treated of the grasshoppers in Kansas and Colorado. Another paper on the influence of the parasites on grasshoppers appeared in the *Kansas University Quarterly*, and the same, with additions, as a bulletin of the department of entomology. Hunter also began his book on the Coccidæ of Kansas, publishing part I in the *Kansas University Quarterly*.

1899.—Assistant Professor Hunter published an account of his work in western Kansas in the bulletin entitled "Alfalfa, grasshoppers, bees; their relationships." Part II of the Coccidæ of Kansas appeared this year. In the report of the Kansas State Board of Agriculture was published an article on the fertilization of the alfalfa blossom by bees, an important note for growers of alfalfa. "The nurseryman and the entomologist" was given before the American Asociation of Nurserymen. "Entomological legislation in the interests of horticulture"—Transactions Kansas State Horticultural Society.

This year shows the broadening of the field of the work of the department among the nurserymen of the state. The governor, at request of Kansas nurserymen, appointed S. J. Hunter state inspector of nurseries. This appointment was continued until 1907.

1900.—The third part of Coccidæ of Kansas, by S. J. Hunter, was published in *Kansas University Quarterly*, vol. IX, No. 2.

"Alfalfa culture and insect life" appeared in the Kansas State Board of Agriculture report.

"Some entomological problems in horticulture," by S. J. Hunter, was published in the report of the Colorado State Board of Horticulture, vol. XI.

An article on spraying was given in the report of the Kansas State Board of Horticulture.

1901.—Doctor Snow returns to his old title, professor of natural history and director of the museum.

The fourth part of the Coccidæ of Kansas appeared in the *Kansas University Quarterly*, vol. X.

An article on selection, natural and artificial, was published in the *Western Fruit Grower* for October of this year.

The *American Journal of Physiology* published the results of Professor Hunter's summer study of sea urchin eggs, at Woods Hole, Mass.

Marguerite E. Wise instructor in botany and entomology.

Prof. S. J. Hunter becomes head of the department of entomology at the University.

1902.—Doctor Snow's title becomes professor of organic evolution, systematic entomology and meteorology.

Professor Hunter published a textbook dealing with the insect fauna of Kansas.

Mr. E. S. Tucker was appointed museum assistant in systematic entomology.

1903.—The various papers on the Coccidæ of Kansas were brought together as a textbook for use in identification of the scale insects.

Results of further biological investigations of Professor Hunter were published in the *Biological Bulletin*, vol. V, No. 3.

1904.—C. E. Sanborn, an advanced student in the department, published a paper on Kansas plant lice.

Another student at this time, Mr. W. J. Meek, published a paper on the structure of some insects, in the *Kansas University Science Bulletin*, vol. II.

1906.—C. E. Sanborn published a further account of plant lice of Kansas, giving a list of them and of their host plants. This paper is of great use in distinguishing the beneficial and injurious forms.

1907.—Report of the entomologist of the Kansas State Horticultural Society.—Trans. Kan. Acad. Sci., vol. XXIX.

The legislature designated the professor of entomology at the University as state entomologist.

The Kansas millers, grain men, and wheat growers raised a fund of about $2500 and asked this department to cope with the green-bug invasion.

P. A. Glenn was made assistant professor of entomology.

CHAPTER 386, LAWS OF 1907.

Creating a State Entomological Commission and Making an Appropriation Therefor.

AN ACT for the protection of the horticultural and agricultural interests of the state of Kansas by the suppression and extermination of San José scale and other injurious insect pests and plant diseases; to create the Kansas Entomological Commission, two state entomologists; and to provide for the punishment for violations thereof, and making appropriations therefor.

SEC. 4. That it shall be the duty of said state entomologists, under the control of the State Entomological Commission, to seek out and suppress pernicious insect pests and injurious and contagious plant diseases hereinbefore mentioned as destructive to the horticultural and agricultural interests of this state, and conduct experiments when necessary to accomplish that end.

1908.—September 20, Doctor Snow's death must here be recorded.

"Experiments with and knowledge of the green bug to date" is found in the report of the Kansas State Board of Agriculture, vol. XXVII, No. 105, by S. J. Hunter.

Report of the state entomologist of Entomological Commission of Kansas.—State report.

1909.—There was published a complete report of the green bug and its natural enemies and telling how to combat it. By S. J. Hunter and P. A. Glenn.

Professor Hunter, jointly with Prof. T. J. Headlee, sent out a circular of information regarding the San José scale, enemy of the fruit grower.

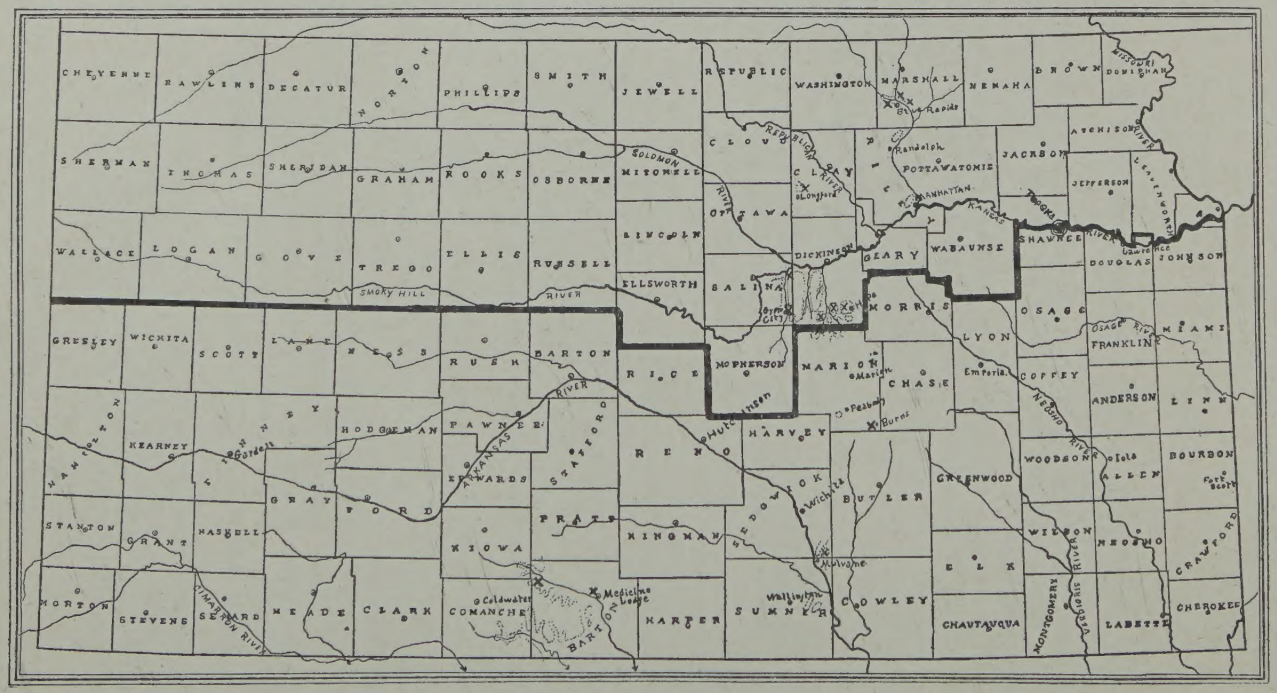
Began a systematic survey of orchard culture and management in Kansas.

1910.—The department of entomology and the department of botany work upon a fundamental investigation of the efficiency of the artificial distribution of the chinch-bug fungus. Professor Billings for botany, Professor Glenn for entomology, working jointly.

Orchard survey continued.

1911.—At request of Kansas millers, conducted special investigation on green bug on southern tier of counties.

Extended orchard survey to practically all of the apple-growing districts of the southern half of the state.



NOTE.—For expediency in the conduct of its field-work the Entomological Commission has assigned the southern half of the state to the State Entomologist at Kansas University, Lawrence, and the northern half to the State Entomologist at the Agricultural College, Manhattan. Therefore, inquiries from the two sections shown on map by the heavy east-and-west line should be directed as above.

Professor Glenn called upon by the state entomologist of Minnesota to conduct entended investigations on the grasshopper in Minnesota.

H. B. Hungerford appointed instructor in entomology.

Departments of entomology and botany published for the United States Department of Agriculture a comprehensive bulletin dealing with the diseases of the chinch bug, Professors Billings and Glenn authors.

At the request of the State Board of Health, the department undertook a serious investigation of the relations existing between the newly introduced disease of pellagra and the sand fly.

H. W. Lohrenz appointed Griesa research fellow in entomology.

1912.—Head of department gives an address before the annual meeting of the American Association of Nurserymen at St. Louis.

Results thus far of work of sand fly and pellagra published in the *Journal of the American Association Medicine,* Chicago.

R. Fraser, Toronto, Canada, appointed to research fellowship in entomology.

Head of department appointed one of a committee of five, representing all parts of the United States, to coöperate in drafting and aiding the passage of a federal law protecting this country against further introduction of injurious insects and plant diseases from foreign countries. The plans formulated by all interests concerned were accepted, and incorporated in the law, which became effective August 20 of this year.

Head of department represented Kansas at the third triennial conference of the National Association for the Study of Pellagra.

Supreme court handed down a decision, all judges concurring, establishing the constitutionality of the law under which the economic work of this department is carried on.

Hungerford and Williams published a paper on "Some Kansas parasitic bees."

In response to a request from the governor of the state, the chancellor appointed the head of the department as chairman of a committee to investigate the horse plague then present in western Kansas.

1913.—Orrel M. Andrews, of Fairmount College, appointed research fellow in entomology.

Dwight Isely, who has just received his master's degree in this department, appointed to Schuyler fellowship in entomology, Cornell University, Ithaca, New York.

Mr. H. B. Hungerford made assistant professor of entomology.

The Entomological Museum, Established in 1870.

HISTORICAL SUMMARY OF ITS DEVELOPMENT.

1870.—Collected by Doctor Snow: 500 specimens (250 species) of insects.

1872.—Donated by students of the University of Kansas, under direction of Professor Snow: 800 specimens of Kansas insects, of which 600 were contributed by Geo. F. Gaumer, and 150 by Samuel Carson.

1873.—Donations:

By students of the University: 300 specimens Kansas insects.
By Professor F. H. Snow: 400 specimens Kansas insects.

1874.—Important aid in the study of natural history is afforded by the cabinet collections, which contain upwards of 12,000 specimens, illustrating chiefly the departments of botany, entomology, and geology.

Donations:

By Geo. F. Gaumer: 300 specimens of Kansas insects.
By E. B. Noyes: 200 specimens of Kansas insects.

1876.—"The collections in entomology have been greatly increased during the past year, chiefly through the voluntary contributions of University students, and now include upwards of 2000 species of Kansas insects.

Donations:

By Prof. F. H. Snow: 4000 Kansas insects; 200 foreign insects.
By Geo. F. Gaumer: 3000 Kansas insects.
By Collin Timmons: 800 Kansas insects.
By Andrew Atchison: 500 Kansas insects.

"The first collecting trip that Doctor Snow made, outside of the vicinity of Lawrence and Douglas county, was in 1876, to Colorado Springs and Pike's Peak. Five members of the graduating class of that year organized a scientific expedition for 'exploration in Colorado.' Professor Snow was invited to accompany the expedition. During the first week of August the student members of the party returned home. Professor Snow and his wife and son Willie remained until September 1."

1877.—The collections in entomology have been greatly increased during the past year, chiefly through voluntary contributions of the scientific expedition to Colorado in the summer of 1876. The cabinets now include upwards of 3000 species of Kansas insects.

Donations:

By Prof. F. H. Snow: 6000 Colorado insects.
By Geo. F. Gaumer: 900 Colorado insects.
By Elmer B. Tucker: 400 Colorado insects.
By Charles W. Smith: 300 Colorado insects.

In the summer of this year Professor Snow and two students, Richard Foster and John H. Walker, made an expedition to Wallace county, where they collected about 1500 specimens of the then rare tiger beetle *Amblychila cylindriformis*, and reduced the market price of these specimens from $15 to $1.

1878.—The entomological collection contains more than 5000 species, representing all the different orders of insects. They are of practical value to the agricultural and horticultural interests of the state, as well as to the students of the University, in the determination of the names and habits of our insect friends and foes.

Donations:

By Geo. F. Gaumer: All the duplicates of his collection of Diptera, about 1000 specimens.

By Prof. F. H. Snow: 3000 Kansas insects and plants,

During August Professor Snow, with Richard Foster and L. L. Dyche, two students in the University, made a trip into Colorado to "Dome Rock," Platte canyon, where they collected insects.

1879.—The entomological collections contain more than 6000 species, representing all the different orders of insects.

Professor Snow, with his family and two student assistants, Miss Annie Mosley and L. L. Dyche, made another trip to Colorado and camped for six weeks near Idaho Springs. They secured a fine collection of butterflies and moths.

1880.—The entomological collections contain more than 7000 species, representing all the different orders of insects.

Donations:

By Lewis L. Dyche: Collection of Colorado Lepidoptera, about 1000 specimens.

By W. G. Raymond: 148 species of Kansas Coleoptera.

Professor Snow and the same party of 1879 went to Santa Fe canon, New Mexico, and in four weeks they collected 237 species and varieties of Coleoptera, many of them new to science and rare, and also many other insects.

1881.—The entomological collections contain more than 8000 species, representing all of the different orders of insects.

Donations:

By J. C. Cooper, Esq., Topeka: Extensive and valuable entomological collections made by his son, the late Geo. P. Cooper.

Professor Snow, with Prof. H. H. S. Smith of the physics department, and Professor Snow's son Willie, and L. L. Dyche, made a trip into New Mexico to the Magdalena mountains, collecting insects.

1882.—The entomological collections contain more than 10,000 species, representing all of the different orders of insects.

Professor Snow, his family, and three students of the University, W. W. Russ, Miss Mary Dyche, and L. L. Dyche, spent nine weeks near the Las Vegas Hot Springs, New Mexico. A general collection of insects was made.

1883.—The entomological collections of the University contain more than 10,000 species. These have been greatly increased during the last few years by the voluntary contributions of the exploring parties in western Kansas, Colorado, and New Mexico. By means of the material thus accumulated, a system of exchanges has been established with leading institutions and naturalists in all parts of the United

States, so that the cabinets contain a very satisfactory representation of the insects not only of the state of Kansas, but also of the whole of North America.

Donations:

By Frank Thompson: Collection of beetles from Mexico.

By Doctor Fritz Gærtner: A collection of Lepidoptera from Honduras.

By J. C. Cooper, Esq., Topeka: A collection of Coleoptera from western Kansas and Colorado.

By L. L. Dyche: Insects from New Mexico.

Doctor Snow, with three students of the University, W. H. Brown, W. C. Stevens, and L. L. Dyche, made an expedition to the same locality as in 1882, collecting insects.

1884.—This year the collecting party, which again visited New Mexico, was divided into two sections. Professor Snow, W. C. Stevens and Willie Snow collected on Walnut creek, near Silver City; and L. L. Dyche and W. H. Brown collected part of the time on Baldy mountain and the rest of it on the headwaters of the Pecos river.

1885.—Donations:

By W. H. Brown and W. C. Stevens: New Mexican insects.

Appropriation of $50,000 by the legislature for the erection of a building on the University grounds for use of the department of natural history.

1887.—Donation:

By M. Braverman: An alcoholic collection of California insects.

1888.—Donations:

By Ed. Graham: Entomological specimens.

By W. R. Cone: A collection of insects from California.

1889.—Donations:

By Prof. L. L. Dyche: A collection of Kansas insects.

By Mrs. L. L. Dyche: A collection of New Mexico Coleoptera.

By J. N. Scott, Joseph Thoburn, M. E. Hickey, and W. E. Brewer: An extensive collection of cocoons and silk products from the state silk station at Peabody, Kan.

By V. L. Kellogg: A set of 25 microscope slides, illustrating the genera and species of Mallophaga.

By Miss Gertrude Crotty: A collection of Coffey county Orthoptera.

Professor Snow made a collecting trip to Estes Park, Colorado.

1890.—Donations:

By W. G. Smith: A collection of Colorado insects.

Professor Snow made a collecting trip to Bailey, Platte canyon, Colorado.

1891.—Donations:

By H. R. Linville, Ness City: Collection of locusts from Ness county.

By H. P. Krehbiel: Specimens of burrowing bees and nests of same.

Professor Snow made a collecting trip to Manitou Park, Colorado.

1892.—Professor Snow made a collecting trip to Estes Park, Colorado.

1894.—Donations:

By W. A. Snow: 2000 Illinois Diptera.

By Prof. L. Bruner, Lincoln, Neb.: Rare Nebraska Diptera.

By S. W. Williston: Collection of Nevada Diptera.

By Dr. S. W. Williston: Collection of Diptera, Douglas county; 20 types of new species of North American Diptera.

By C. Faulkner, Atchison, Kan.: 300 species of Kansas Microdiptera.

By Prof. J. M. Aldrich, Moscow, Idaho: Diptera from South Dakota and elsewhere, with types of new species.

By Dr. Geo. F. Gaumer: 1000 specimens of United States Diptera; 5000 Yucatan insects.

By Nathan Banks, Sea Cliff, N. Y.: Neuroptera and Diptera from New York.

By C. W. Johnson, Philadelphia: 100 specimens of Diptera from eastern United States.

Doctor Snow made a collecting trip to the Magdalena mountains, New Mexico.

1896.—S. J. Hunter went to western Kansas to make a study of the grasshopper problem, and collected insect specimens amounting to about 10,000 specimens.

1897.—Professor Snow made a collecting trip to Estes Park, Colorado.

1898.—Professor Hunter conducted a collecting expedition to western Kansas.

1899.—Professor Hunter conducted a collecting expedition to western Kansas.

1900.—Professor Hunter collected on the Atlantic coast.

1902.—Doctor Snow conducted a collecting expedition to Hamilton and Morton counties, Kansas.

Doctor Snow also made a collecting trip to Oak Creek canyon, and Humphrey's Peak, Arizona.

1903.—Doctor Snow conducted a collecting expedition to Clark county, Kansas.

Doctor Snow also conducted a collecting expedition to Martinez, or Congress Junction, and Williams Fork of Colorado river.

1904.—Doctor Snow, with his regular assistant, Mr. E. F. Tucker, and Dr. C. F. Adams spent three weeks at Galveston, Tex., making a general collection of insects.

Doctor Snow also visited Oak Creek canyon, Coconino county, Arizona, being assisted by Prof. W. H. Johnson and two students, Eugene Smythe and Judah Drisco.

1905.—Doctor Snow spent a month at Brownsville, Tex., and was assisted by Mr. Tucker and an undergraduate student, Mr. E. G. Corwine.

Later this same summer Doctor Snow, Eugene Smythe, Ebb. Crumb and Rollin Perkins spent five weeks at San Bernardino ranch, on Sycamore creek, Cochise county, Arizona.

1906.—Doctor Snow, assisted by L. A. Adams, S. E. Crumb and Eugene Smyth, spent June and July in Pima county, Arizona, making a general collection of insects.

1907.—Doctor Snow made his last collecting trip to the Santa Rita mountains, Arizona. He was assisted on this expedition by W. J. Baumgartner, W. R. B. Robertson, Fred Farragher, and Eugene Smythe.

1908.—By act of the board of regents, the collections were called "The Francis Huntington Snow Entomological Collections," in acknowledgment of the work done by Doctor Snow.

1909.—A valuable collection of exotic Coleoptera and Lepidoptera was added, part donated by Miss Barteldes, part by Mr. Sedgwick.

1910.—Mr. Francis X. Williams, of Leland Stanford University, was appointed assistant curator of the entomological collection.

Mr. F. X. Williams conducted a party, consisting of Messrs. Slagle, Bradbury and Hungerford, into northwestern Kansas, and made a biological and systematic survey of thirteen counties, and brought back 30,000 specimens.

1911.—Mr. F. X. Williams and Messrs. Lockwood, Lovejoy and Ray Miller spent the whole of the summer in southwestern Kansas, continuing the systematic survey and collecting specimens, and brought back 25,000 specimens.

1912.—Mr. F. X. Williams and a party consisting of Messrs. Isely, Mallory, O'Roke and Jennings spent the summer in the eastern half of the northwestern quarter of Kansas, continuing the systematic survey and bringing back a large number of specimens.

1913.—Professor Hunter, the curator, Assistant Professor Hungerford, Mr. Collett, fellow, and Mr. Vansell, assistant, made up the expedition which collected along Rock river, Wyoming, and Beaver creek, Montana.

SCIENTIFIC EXPEDITIONS OF THE ENTOMOLOGICAL MUSEUM OF THE UNIVERSITY OF KANSAS FROM 1876 TO THE PRESENT TIME.

1876.—Colorado Springs and Pike's Peak, Colorado.
1877.—Wallace county, Kansas.
1878.—Gove county, Kansas.
1879.—"Dome Rock," Platte canyon, Colorado.
1879.—Idaho Springs, Colorado.
1880.—Santa Fe canyon, New Mexico.
1881.—Magdalena mountains, twenty-five miles west of Socorro.
1882.—Las Vegas Hot Springs, New Mexico.
1883.—Gallinas canyon, near Las Vegas Hot Springs, New Mexico.
1884.—New Mexico.
1889.—Estes Park, Colorado.
1890.—Bailey, Platte canyon, Colorado.
1891.—Manitou Park, Colorado.
1892.—Estes Park, Colorado.
1894.—Magdalena mountains, New Mexico.
1897.—Estes Park, Colorado; Edwards, Finney, and Hamilton counties, Kansas.
1898.—Hamilton, Wallace and Greeley counties, Kansas.
1899.—Cheyenne and Sherman counties, Kansas.
1900.—Woods Hole, Massachusetts.
1901.—Buzzard's Bay.
1902.—Hamilton and Morton counties, Kansas.
1902.—Oak Creek canyon and Humphrey's Peak, Arizona.
1903.—Clark county, Kansas.
1903.—Martinez, or Congress Junction, and Williams Fork of Colorado river.
1904.—Galveston, Texas.
1904.—Oak Creek canyon, Coconino, Arizona.
1905.—Brownsville, Texas; San Bernardino ranch, on Sycamore creek, Cochise county, Arizona.
1906.—Pima county, Arizona.
1907.—Santa Rita mountains, Arizona.
1910.—Gove, Logan, Sheridan, Rawlins, Decatur, Thomas, Cheyenne, Sherman, Wallace, Greeley, Wichita, Scott, and Lane counties, Kansas.
1911.—Pratt, Kiowa, Meade, Haskell, Grant, Stanton, Morton, Stevens, Seward and Clark counties, Kansas.
1912.—Barton, Rush, Ness, Trego, Ellis, Russell, Osborne, Rooks, Graham, Norton, Phillips, and Smith counties, Kansas.
1913.—Rock river, Wyoming; Beaver creek, Montana.

Insect Types and Cotypes in Entomological Museum.

Order NEUROPTERA.

Hemerobidæ.

Glenuyus snowii Banks.

Order ORTHOPTERA.

Mantidæ.

Stagomantis gracilipes Rehn.

Tryxalinæ.

Cordillacris pima Rehn.

Œdipodinæ.

Lactista arphoides Rehn.
Trimerotropis snowii Rehn.

Acridiinæ.

Melanoplus blatchleyi Scudd.
bruneri Scudd.
gladstoni Brunn.
intermedius Brunn.
snowi Scudd.

Locustidæ.

Ceuthophilus tuckeri Rehn.
Plagiostira gracilis Rehn.
Ceutophilus paucispinosa Rehn.
Phrixocnemis franciscanus Rehn.
Phrixocnemis socorrensis Rehn.
Udeopsylla serrata Rehn.

Order HEMIPTERA.—Heteroptera.

Coreidæ.

Alydus setosus V. D.

Berytidæ.

Jalysus wickhami V. D.

Capsidæ.

Xestocrus nitens Reut.
Diaphnidia debilis Uhl.
Orthoptylus translucens Tucker.
Oncotylus sericatus Uhl.

Tingitidæ.

Corythuca pergandei Heid.

Order HEMIPTERA.—Homoptera.

Coccidæ.

Aspidiotus fernaldi ckll. var. albiventer Hunter.
æsculi Johns. sub. sp. solus Hunter.
Diaspis snowii Hunter.
Lecanium kansasense Hunter.
aurantiacum Hunter.
cockerelli Hunter.
Lecaniodiaspis (?) parrotti.

ORDER HEMIPTERA.—HOMOPTERA.

Fulgoridæ.

Scolopsella reticulata Ball.
Oecleus snowii Ball.

Bythoscopidæ.

Pediopsis erythrocephalus G. & B.
Idiocerus snowii G. & Pr.
perplexus G. & B.
rufus G. & B.
Agallia gilletei O. & B.

Jassidæ.

Memnoinia consobrina Ball.
fraterna Ball.
Parabolocratus brunneus Ball.
Deltocephalus flexuosus Ball.
Athysanus alpinus Ball.
Eutettix scitula Ball.
insana Ball.
striata Ball.
texana Ball.
snowi Ball.
osborni Ball.
Phlepsius graphicus Ball.
cumulatus Ball.
denudatus Ball.
turpiculus Ball.
Scaphoideus blandus Ball.
Lonatura noctuaga Ball.
salsura Ball.
Thamnotettix cockerelli Ball.
osborni Ball.
Empoasca atrolabes Gill.
unicolor Gill.
alboneura Gill.
nigroscuta G. & B.

ORDER COLEOPTERA.

Elateridæ.

Cardiophorus arizonensis Fall.

Cleridæ.

Cymatodera arizonæ Wolcott.
subsimilis Wolcott.
Clerus snowi Wolcott.
bioculatus Skinner.
Hydnocera ornata Wolcott.
cæruleipennis Wolcott.

Scarabeidæ.

Ochodaeus kansanus Fall.

Cerambycidæ.

Leptostylus yuceæ Fall.

Chrysomelidæ.

Pachybrachys notatus Bow.
discolor Bow.

Meloidæ.

Hornia? gigantea Wellman.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Tipulidæ.

Eriocera eriophora Will.
obscura Will.
Rhaphidolabis debilis Will.
Tipula acuta Doane.
dorsimacula Walker.
dorsolineata Doane.
retusa Doane.
unincineta Doane.
spectabilis Doane.
streptocera Doane.
sulphurea Doane.

Psychodidæ.

Psychoda slossoni Will.

Chironomidæ.

Tersesthes torrens Towns.
Ceratopogon dimidiatus Adams.
flavus Will.
Chironomus anonymus Will.
flaviventris Johan.
longimanus Will.
lucifer Johan.
microcerus Will.
Alabesmyia aurea Johan.

Culicidæ.

Culex affinis Adams.
apicalis Adams.
particeps Adams.

Mycetophilidæ.

Ceroplatus apicalis Adams.
Platynura gracilis Will.
notabilis Will.
pulchra Will.
Sciophila angulata Adams.
nigricauda Adams.
Syntemna mutor Adams.
Neoglaphyroptera cuneola Adams.
lineola Adams.
striata Will.
Macrocera diluta Adams.
Eugnoriste occidentalis Coq.

Cecidomyidæ.

Asphondylia atriplicis Towns.
Cecidomyia raditæ Snow.

Simuliidæ.

Simulium argus Will.
notatum Adams.

Stratiomydæ.

Scoliopelta luteipes Will.
Hermetia comstocki Will.
eiseni Towns.
Ptecticus sackeni Will.
Chrysochroma albipes Towns.
Macrosargus clavis Will.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Stratiomydæ—continued.

Odontomyia americana Day.
flava Day.
pilosa Day.
pubescens Day.
Euparyphus albipilosus Adams.
limboventris Will.
mutabilis Adams.
ornatus Will.
septemmaculatus Adams.
Clitellaria argentata Will.
Nemotelus abdominalis Adams.
bruesii Mel.
kansensis Adams.
trinotatus Mel.

Tabanidæ.

Pangonia dives Will.
fera Will.
Silvius pollinosus Will.
Chrysops bistellatus Dæck.
discalis Will.
frazari Will.
pachyceras Will.
Chrysops pertinax Will.
sequax Will.
Tabanus baal Towns.
fenestra Will.
fratellus Will.
fur Will.
guttatues Towns.
hyalinipennis Hine.
laticeps Hine.
osborni Hine.
parvulus Will.
productus Hine.
pygmæus Will.
sodalis Will.
Snowiellus atratus Hine.

Leptidæ.

Xylophagus decorus Will.
gracilis Will.
nitidus Adams.
Xylomyia parens Will.
Arthroceras pollinosum Will.
Leptis palpalis Adams.
pleuralis Adams.
Chrysopila bella Adams.
flavibarbis Adams.
lucifera Adams.
Symphoromyia flavipalpis, Adams.
pachyceras Will.
plangens Will.

Nemestrinidæ.

Hirmoneura flavipes Will.
Rhynchocephalus sackeni Will.
volaticus Will.

Cyrtidæ.

Acrocera liturata Will.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Bombylidæ.

Anthrax aemulus O. S.
agrippina O. S.
alta Tucker.
comparata Tucker.
cuniculus O. S.
faustina O. S.
livia O. S.
moneta O. S.
sabina O. S.
Triplasius novus Will.
Heterostylum sackeni Will.
Anastoechus melanobalteralis Tucker.
fulvipennis Tucker.
melanobalteralis var.
Lordotus pulcherrimus Will.
Eclimus auratus Will.
lotus Will.
melanosus Will.
sodalis Will.
Desmatoneura argentifrons Will.
Aphœbantus carbonarius O. S.
conurus O. S.
cyclops O. S.
Desmatomyia anomala Will.
Dolichomyia gracilis Will.

Therevidæ.

Psilocephala acuta Adams.
lateralis Adams.
occipitalis Adams.
Thereva anomala Adams.
crassicornis Will.

Scenopinidæ.

Scenopinus electa Adams.
mirabilis Adams.

Mydaidæ.

Ectypus townsendi Will.
luteolus Will.
Mydas abdominalis Adams.
scitulus Will.

Apioceridæ.

Rhaphiomydas mellifex Towns.
xanthos Towns.

Asilidæ.

Stenopogon aeacidinus Will.
Triclis tagax Will.
Myelaphus rufus Will.
Dioctria pusio O. S.
nitida Will.
sackeni Will.
Cyrtopogon dasyllis Will.
dubius Will.
?gibber Will.
præpes Will.
Lasiopogon terricola Johnson.
Holopogon snowii.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Asilidæ—continued.

Saropogon albifrons Black.
Deromyia perplexa M. A. C.
Taracticus brevicornis Will.
Cophura? breviconis Will.
fur Will.
scitula Will.
Atonia mikii Will.
Nicocles abdominalis Will.
rufus Will.
Nusa chalybea Will.
Laphria canis Will.
carbonarius Will.
ferox Will.
pubescens Will.
ruficauda Will.
ventralis Will.
vivax Will.
xanthippe Will.
Ommatius nigromaculosus Back.
Proctacanthus arno Towns.
Erax dubius Will.
jubatus Will.
latrunculus Will.
leucocomus Will.
similis Will
stamineus Will.
varipes Will.
Mallophora guildiana Will.
Promachus albifaces Will.
princeps Will.
rufipes Fabr.
Stenoprosopus arizonensis Will.
Neoitamus affinis Will.
distinctus Will.
Tolmerus delusus Tucker.
callidus Will.
mesæ Tucker.
Philodicus rufipennis Hine.
Asilus angustifrons Will.
astutus Will.
Rhadiurgus leucopogon Will.

Dolichopodidæ.

Psilopodinus insularis Ald.
Diaphorus contiguus Ald.
dubius Ald.
flavipes Ald.
simplex Ald.
spectabilis Loew.
Asyndetus fratellus Ald.
Chrysotus albipalpus Ald.
excisus Ald.
hirsutus Ald.
niger Ald.
proximus Ald.
Eutarsus sinuatus Ald.
Parasyntormon occidentale Ald.
Sympycnus frater Ald.
Anepsiomyia linearis Ald.
Neurigona lateralis Say.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Dolichopodidæ—continued.

Thinophilus pectinifer Wheeler.
Thrypticus cupuliferus Ald.
singularis Ald.
Hydrophorus canescens Wheeler.
Liancalus hydrophilus Ald.
similis Ald.
Dolichopus albicoxa Ald.
ciliatus Ald
coloradensis Ald.
convergens Ald.
dakotensis Ald.
duplicatus Ald.
grandis Ald.
angustatus Ald.
idahoensis Ald.
kansensis Ald.
marginatus Ald.
obcordatus Ald.
occidentalis Ald.
plumosus Ald.
tenuipes Ald.
vigilans Ald.
willistonii Ald.
Herocostomus latipes Ald.
Paraclius filifer Ald.
venustus Ald.
Sarcionus lineatus Ald.
Pelastoneurus argentifer Ald.
kansensis Ald.

Empididæ.

Drapetis flavida Will.
flaviceps Will.
Paraxhalassius aldrichi Mel.
Thinodromia inchoata Mel.
Hilara nugax Mel.
Rhamphomyia sociabilis Will.

Phoridæ.

Aphiochæta halictorum Mel. & Brues.

Platypezidæ.

Callimyia venusta Loew.
Calotarsa calceata Snow.
ornatipes Towns.
Platypeza abscondita Snow.
cinerea Snow.
pulchra Snow.
tæniata Snow.
umbrosa Snow.
unicolor Snow.

Pipunculidæ.

Pipunculus fuscitaris Adams.

Syrphidæ.

Microdon lanceolatus Adams.
melgaogaster Snow.
pallipennis Snow.
violens Towns.
xanthophilus Towns.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Syrphidæ—continued.

Callicera montensis Snow.
Nausigaster scutellaris Adams.
Chilosia chalybescens Will.
lucta Snow.
nigripennis Will.
tarda Snow.
willistonii Snow.
Baccha bella Will.
Platychirus palmulosus Snow.
Melanostoma cœrulescens Will.
concinnum Snow.
kelloggi Snow.
Syrphus creper Snow.
disgregus Snow.
montivagus Snow.
pullulus Snow.
ruficauda Snow.
Xanthogramma habilis Snow.
Sphærophoria melanosa Will.
Brachyopa cynops Snow.
Volucella apicifera Towns.
Eristalis montanus Will.
Tropidia incana Towns.
Helophilus dychei Will.
Mallota albipilis Snow.
Criorhina lupina Will.
Spilomyia kahlii Snow.
Ceria snowi Adams.
townsendii Snow.

Conopidæ.

Conops bellus Adams.
fronto Will.
sylvosus Will.
gracilis Will.
xanthopareus Will.
Physocephala affinis Will.
burgessi Will.
furcillata Will.
Zodion albitus Adams.
bicolor Adams.
parvum Adams.
pictulum Will.
pygmæum Will.
scapulare Will.
Stylogaster neglecta Will.
Dalmannia picta Will.
Oncomyia baroni Will.
modesta Will.
modesta, var. melanopoda Will.
propinqua Adams.
Myopa pictipennis Will.
pilosa Will.
plebeia Will.
tectura Adams.

Tachinidæ.

Cistogaster pallasii Towns.
Phorantha occidentis Walk.
Alophora æneoventris Will.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Tachinidæ—continued.

Euscopolia dakotensis Towns.
Trichopoda subcilipes Towns.
Ceratomyiella conica Towns.
Rhinophora mexicana Towns.
valida Towns.
Anisia vanderwulpi Towns.
Euryceromyia robertsonii Towns.
Hypostena floridensis Towns.
indecisa Towns.
vanderwulpi Towns.
Hyalurgus johnsoni Towns.
Polidea americana Towns.
Eumyothyria illinoisensis Towns.
Leucostoma atra Towns.
neomexicana Towns.
senilis Towns.
Clytiomyia flava Towns.
Wahlbergia atripennis Towns.
Epigrymyia floridensis Towns.
geniculata Towns.
lucens Towns.
polita Towns.
robertsonii Towns.
Ginglymyia acrirostris Towns.
Plagiprospherysa floridensis Towns.
valida Towns.
Plagia aurifrons Towns.
Siphoplagia anomala Towns.
Goniochæta plagioides Towns.
Chætoglossa picticornis Towns.
violæ Towns.
Pachyophthalmus aurifrons Towns.
floridensis Towns.
Pseudotractocera neomexicana Towns.
Belvosia vanderwulpi Will.
Malanophrys flavipennis Will.
Aphria ocypterata Towns.
Ocyptera argentea Towns.
Nemoræa hyphantriæ Towns.
nigricornis Towns.
Gymnochæta ruficornis Will.
vivida Will.
Hyphantrophaga hyphantriæ Towns.
Exorista eudryadis Towns.
lagoæ Towns.
plagioides Towns.
Euphorocera tachinomoides Towns.
Phorocera comstocki Will.
lophyri Towns.
puer Will.
Hypertrophocera parvipes Towns.
Frontina archippivora Will.
frenchii Will.
Sturmia nigrita Towns.
Masicera eufitchiæ Towns.
exilis Coq.
hemarides Towns.
Prospherysa promiscua Towns.
websterii Towns.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Tachinidæ—continued.

Vanderwulpia atrophopodoides Towns.
sequens Towns.
Tachina flavidensis Towns.
spinulosa Towns.
robusta Towns.
Dæochæta harveyi Towns.
Neotractocera anomala Towns.
Paraphyto gillettei Towns.
Blepharipeza nigrisquamis Towns.
rufescens Towns.
Muscopteryx chætosula Towns.
Paradidyma braueri Will.
singularis Towns.
Atrophopalpus angusticornis Towns.
Phorichæta sequax Will.
Metopia luggeri Towns.
Hilarella decens Towns.
elita Towns.
polita Towns.
Brachycoma chihuahuaensis Towns.
intermedia Towns.
sarcophagina Towns.
Euthyrosopa petiolata Towns.
Gonia porca Will.
exul Will.
senilis Will.
sequax Will.
Spallanzania finitima Snow.
Cnephalia pansa Snow.
Eucnephalia gonoides Towns.
Amobia distincta Towns.
Archytas hystricoides Will.
Echinomyia dakotensis Will.
hystricosa Will.
Epalpus bicolor Will.
maculatus Will.
signiferus Wlk.
Jurinella exilis Towns.
soror Will.

Dexiidæ.

Hystrichodexia roederi Will.
Melanodexia tristis Will.

Sarcophagidæ.

Sarcophaga chætopygialis Will.
cimbicis Towns.
concinnata Towns.
helicis Towns.
leucaniæ Towns.
micropygialis Will.
(Tephromyia) hunteri Hough.
Sarcodexia sternodontis Towns.

Musicidæ.

Chrysomyia desvoidyi Hough.
Morellia nigricosta Hough. (S. Am.)
Hæmatobia alcis Snow.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Borboridæ.

Aptilotus politus Will.
Limosina exigua Adams.
evanescens Tucker.
setigera Adams.

Sciomyzidæ.

Tetanocera inopa Adams.

Sapromyzidæ.

Pachycerina dolorosa Will.
Sapromyza ingrata Will.
octovittata Will.
polita Will.
puella Will.
sororia Will.

Ortalidæ.

Rivellia brevifasciata Johnson.
Euxesta apicalis Will.

Trypetidæ.

Spilographa diffusa Snow.
Trypeta occidentalis Snow.
Polymorphomyia basilica Snow.
Œdaspis minuta Snow.
montana Snow.
Rhagoletis zephyria Snow.
Eutreta longicornis Snow.
Eurosta fenestrata Snow.
reticulata Snow.
Xenochæta dichromata Snow.
Icterica fasciata Adams.
Tephritis dupla Cress.
pallidipennis Cress.
obscuripennis Snow.
variabilis Doane.
Euaresta bellula Snow.
latipennis.
Urellia conjuncta Adams.
flava Adams.
occidentalis Adams.

Micropezidæ.

Micropeza turcana Towns.
Calobata pleuritica Johnson.

Ephydridæ.

Notiphila decoris Will.
Paralimna multipunctata Will.
obscura Will.
Discomyza dubia Will.
Discocerina obscura Will.
Ochtheroidea atra Will.
Ephydra pygmæa Will.
tarsata Will.

ORDER DIPTERA. (NORTH AMERICAN LIST.)

Oscinidæ.

Chlorops albifacies Adams.
appropinqua Adams.
bilineata Adams.
cinereipennis Adams.
halteralis Adams.
ingrata Will.
liturata Adams.
parva Adams.
recurva Adams.
rubicunda Adams.
Hippelates splendens Adams.
Elachiptera bilineata Adams.
Oscinis collusor Towns.
incipiens Will.

Drosophilidæ.

Drosophila coffeata Will.
ornatipennis Will.
pallida Will.

Agromyzidæ.

Agromyza lateralis Will.
sorosis Will.
Opthalmomyia lacteipennis Loew.
lobioptera Will.

Hippoboscidæ.

Trichobius dugesii Towns.

Nycteribiidæ.

Nycteribia antrozoi Towns.

ORDER LEPIDOPTERA.

Hesperidæ.

Pyrgus nessus Edw. (Cotype.)
polingii Barnes.
occidentalis Skinner.
Heteropia melon, var. arizonensis Skinner.
Megathymus polingii Skinner.

Saturniidæ.

Hyperchiria zephyria Grt.

Syntomidæ.

Cosmosoma rubrogutta Skinner.
Syntomeida befana Skinner.
Scepsis packardii, var. cocklei Dyar.

Lithosiidæ.

Ruscino arida Skinner.

Arctiidæ.

Alexicles aspersa Grt.
Pygoctenucha funerea Grt.
Hemihyalea labecula Grt.
Bertholdia trigona Grt.

ORDER LEPIDOPTERA.

Noctuidæ.

Cyathissa quadrata Sm.
Perigaea morsa Smith.
Hadena burgessi Morr.
Oncocnemis major Grt.
Acopa perpallida Grt.
Aleptina flavomedia Sm.
Rhynchagrotis minimalis Grt.
bimarginalis Grt.
mirabilis Grt.
Peridroma grandipennis Grt.
Noctua conchis Grt.
beata Grt.
Chorizagrotis terrealis Grt.
Feltia circumdata Grt.
Porosagrotis catenula Grt.
Euoxa olivalis Grt.
ura Sm.
flavidens Sm.
cænis Grt.
munis Grt.
infausta Wlk., var. rufula Sm.
verticalis Grt.
basalis Grt.
anacosta Sm.
Richia parentalis Grt.
decipiens Grt.
distichoides Grt.
Mamestra prodeniformis Sm.
artesta Sm.
arida Sm.
æsculi Sm.
Barathra occidenta Grt.
Trichorthosia parallella Grt.
Anarta mimula Grt.
Hydroecia juvenalis Grt.
Pyrrhia stilla Grt.
Heliothis suavis Hy. Edw.
Rhodosea julia Grt.
Rhododipsa mimana. Grt.
Grotella dis Grt.
Bessula luxa Grt.
Autographa snowi Hy. Edw.
Marasmalus inficita Wlk., var. histrio Grt.
Eucalyptra gigantea Grt.
Excaria clauda Grt.
Metoponia nanata Neum.
Minofala instans Sm.
Homopyralis miserulata Grt.
cinctus Sm.
Euclidia intercalaris Grt.
Caliptera bucetum Grt.
Renia rigida Sm.
Hypenula cominalis Sm.
Palthis albisinuatus Sm.
Rhescipha snowi Skinner.

Lasiocampidæ.

Gloveria diasoma Grt.

ORDER LEPIDOPTERA.

Geometridæ.

Cœnocalpe fervifactaria Grt.
formosata Strck.
Emplocia inconstans Geyer.
Fernaldella stalachtaria Strck., var. alternaria Grt.
Deilinia elimaria Hulst.
perpallidaria Grt.
Sciagraphia cruciata Grt.
Caripeta equalaria Grt.
Glaucina puellaria Dyar.
Phæoura mexicanaria Grt.
Eucaterva variaria Grt.
(var.) sabesaria Grt.
Lychnosea helveolaria Hulst.
Therina vitraria Grt.
Hyperitis indiscretata Hy. Edw.
Metanema excelsa Strck., var. simpliciaria Grt.
Sabulodes sulphurata imitata Hy. Edw.
catenulata Grt.

Sesiidæ.

Melittia snowii Hy. Edw.

Pyralidæ.

Symphysa simplicialis Kearf.
Evergestis obliquilis Grt.
Elophila avernalis Grt.
Prionapteryx baboquinariella Kearf.
Crambus dimidiatellus Grt.
Dioryctria aurantiacella Grt.

Tortricidæ.

Proteoteras arizonæ Kearf.
Epinotia snowiana Kearf.

Yponomeutidæ.

Plutella yumaella Kearf.

Blastobasidæ.

Holocera arizoniella Kearf.

Tineidæ.

Trichophaga crescentella Kearf.

ORDER HYMENOPTERA.

Tenthredinidæ.

Hylotoma conspiculata MacG.

Evaniidæ.

Hyptia texana Brad.

Ichneumonidæ.

Ichneumon arizonensis Vier.
egregiafascialis Vier.
citrinifacialis Vier.
flavicornis Cress.
varriola Cres.
oryxiocornis Vier.

ORDER HYMENOPTERA.

Ichneumonidæ—continued.

Ichneumon nigrosignatus Vier.
hemimelanarius Vier.
humphreyi Vier.
flavofascialis Vier.
(Barichneumon) flavofascialis Vier.
maurus Cress.
Syndipnus erythrogaster Vier.
Platylabus omniferrugineus Vier.
Phygadeuon oryxicornis Vier.
spinicoxus Vier.
Cryptus citrinimaculatus Vier.
consobrinus Vier.
politicalypterus Vier.
Nematopodius exclamans Vier.
Mesostenus discoidaloides Vier.
Hemiteles manitouensis Vier.
laphroscopoides Vier.
Pezomachus homalommoides Vier.
testaceicoxus Vier.
alogus Vier.
Ophion idoneum Vier.
Eremotylus felti Vier.
Thyreodon morio Fabr., var. transitionalis Vier.
snowi Vier.
Nototrachys reticulatus Cress.
Anomalon fulvescens, var. hemimelas Vier.
pæneferrugineum Vier.
Atrometus angitioides Vier.
Campoplex photomorphus Vier.
wyomingensis Vier.
Limnerium lawrencei Vier.
vigile Vier.
perdistinctum Vier.
Idechthis biconjunctus Vier.
pænerivalis Vier.
Amorphota perrivalis Vier.
pænexareolata Vier.
confluens Vier.
confluens Vier., mutation a.
confluens Vier., mutation b.
confluens Vier., mutation c.
augusta Vier.
galvestonensis Vier.
nocturna Vier.
relativa Vier.
ferruginosa Vier.
autumnalis Vier.
Ischnoscopus tæniatus Vier.
Angitia autumnalis Vier.
Mesochorus noctivagus Vier.
Olesicampa melanerythrogastra Vier.
Thersilochus hamiltonensis Vier.
snowi Vier.
egregiacolor Vier.
mimeticus Vier.
quintilis Vier.
Metopius grandior Vier.
Bœthus ænigmaticus Vier.

ORDER HYMENOPTERA.

Ichneumonidæ—continued.

Synchnoporthus tuckeri Vier.
Callidiotes kansensis Brues.
Scopiarius monticola Brues.
Agathobanchus bradleyi Vier.
Pimpla parvialba Vier.
landerensis Vier.
Glypta aprilis Vier.
brunneisigna Vier.
egregiafovea Vier.
succineipennis Vier.
Arenetra leucotænia Vier.
Pristomerus appalachianus Vier.
appalachianus, var. dorsocastaneus Vier.
Harrimaniella pæneimitatrix Vier.
Lampronota occidentalis Cress.

Braconidæ.

Bracon kansensis Vier.
piceipes Vier.
Lysiphlebus succineus Vier.
Melanobracon ulmicola Vier.
Vipio erythrus Vier.
piceipectus Vier.
Rhogas fuscicaudus Vier.
melanothorax Vier.
cockerelli Vier.
Chelonus altitudinis Vier.
egregicolor Vier.
exogyrus Vier.
nucleolus Vier.
texanoides Vier.
Microgaster tuckeri Vier.
Diachasma appalachicola Vier.
secunda Vier.
Boisteres indotatus Vier.
Ichneutidea preteroptoides Vier.
Cardiochiles nigroclypeus Vier.
Ascogaster mimeticus Vier.
Agathis wyomingensis Vier.
Microdus agathoides Vier.
nigrotrochantericus Vier.
pimploides Vier.
castaneicinctus Vier.
wichitanensis Vier.
Crassomicrodus nigricaudus Vier.
Lytopylus azygos Vier.
Meteorus campestris Vier.
relativus Vier.
noctivagus Vier.
Dinotrema signifrons Vier.
Brachistes nocturnus Vier.
Zele crassicalcaratus Vier.
Cœnocelius politifrons Vier.
Iphiaulax perepicus Vier.
propinquus Vier.
militaris Vier.
melanogaster Vier.
cinnabarinus Vier.
triangulifera Vier.

ORDER HYMENOPTERA.

Braconidæ—continued.

Opius aberrans Vier.
basiniger Vier.
luteiceps Vier.
nigrocastaneus Vier.
Aphaereta delosa Vier.
subtricarinata Vier.
Aspilota columbiana Vier.
Hormiopterus claripennis Brues.
Phaenodus caddous Vier.
Hedysomus wichitus.
Doryctes femur-rubrum Vier.
apacheus Vier.
Doryctomorpha shoshonea Vier.

Chalcididæ.

Leucospis bicincta Vier.

(*Proctotrupidæ*) *Serphidæ.*

Scelio monticola Brues.
striaticollis Brues.
venata Brues.

Chrysididæ.

Notozus connexus Vier.
Chrysis equidens Vier.
kahli Vier.
kansensis Vier.
petronella Vier.
snowi Vier.

Mutillidæ.

Mutilla crepuscula Vier.
nigricauda Vier.
prognoides Vier.
apachea Vier.
montivagoides Vier.
quintilis Vier.
imperialiformis Vier.
Brachycystis stictinotus Vier.

Scoliidæ.

Elis pollenifera Vier.
pollenifera Vier, var. A. Vier.

(*Pompilidæ*) *Psammocharidæ.*

Anoplius snowi Vier.
Cryptochelius pæneparcus Vier.
Aporus ferrugineipes Vier.
Pepsis angustimarginata Vier.

Sphecidæ.

Sphex ashmeadi Fernald.
Parasphex ferrugineus Fox.

Larridæ.

Larropsis minor Williams.
ater Williams.
pænerugosa Vier.
tachysphecoides Vier.
vegetoides Vier.
zerbeii Vier.

ORDER HYMENOPTERA.

Larridæ—continued.

Tachysphex clarkonis Vier.
crassiformis Vier.
robusterior Williams.
consimiloides Williams.
sculptiloides Williams.
nigrocaudatus Williams.
plenoculiformis Williams.
crenuloides Williams.
dentatus Williams.
sepuleralis Williams.
glabrior Williams.
Tachytes intermedius Vier.
Plenoculus apicalis Williams.
Niteliopsis kansensis Williams.
Niteliopsis foxii Vier.

Nyssonidæ.

Gorytes gulielmi Vier.
papagorum Vier.
subaustralis Vier.
Nysson clarconis Vier.
intermedius Vier.

Philanthidæ.

Philanthus clarconis Vier.
magdalenae Vier.
Dideneis crassicornis Vier.

Pemphredonidæ.

Passalœcus equalis Vier.
Diodontus brunneicornis Vier.

Crabronidæ.

Trypoxylon quintilis Vier.
regularis Vier.
Crabro canonicola Vier.
cinctibellus Vier.
clarconis Vier.
Crabro papagorum Vier.
Oxybelus exclamans Vier.
viciniformis Vier.
Notoglossa calligaster Vier.
pænemarginatus Vier.
tænigaster Vier.

Eumenidæ.

Eumenes bolliformis Vier.
enigmatus Vier.
cruciferarum Vier.
globulosiformis Vier.
marginilineatus Vier.
Odynerus yumus Vier.
amphichrous Vier.
anormiformis Vier.
cochisensis Vier.
congressus Vier.
delodontus Vier.
egregius Vier.

ORDER HYMENOPTERA.

Eumenidæ—continued.

Odynerus excentralis Vier.
gulielmi Vier.
leionotus Vier.
pimorum Vier.
microstictus Vier.
maricoporum Vier.
papagorum Vier.
pænevagus Vier.
percampanulatus Vier.
rectangulis Vier.
sulfuritinctus Vier.
pulverulenta Vier.
spectabiliformis Vier.
hidalgiformis Vier.
subtoltecus Vier.
canaliculatus Vier.
provisoreus Vier.
tempiferus Vier.

Vespidæ.

Polistes exclamans Vier.

Apoidea.

Andrena alaskensis Vier.
delosa Vier.
Perdita klagesi Vier.
Melissodes duplocincta Ckll.
galvestonensis Ckll.
herrickii Ckll.
hexacantha Ckll.
nigrosignata Ckll.
pallidisignata Ckll.
prælauta Ckll.
portivagans Ckll.
semitristis Ckll.
tenuitarsis Ckll.
Xenoglossa pruinosa, var. limitaris Ckll.
strenua, var. Kanensis Ckll.
Anthophora montaniformis Vier.
Synhalonia gilletti, sub. sp. snowii Ckll.
fuscotincta Ckll.
lippiæ, var. sublippiæ Ckll.
Diadasia afflicta perafflicta Ckll.
Exomalopsis snowii Ckll.
Psithyrus tricolor Franklin.
consultis Franklin.

ORDER DIPTERA. (AFRICAN.)

Tabinidæ.

Hinea flavipes Adams.
Tabanus tarsalis Adams.

Asilidæ.

Promachus flavibarbis Adams.
apicalis Adams.
solus Adams.
negligens Adams.
Sisyrnodites major Adams.
nigrifimbriis Adams.

ORDER DIPTERA. (AFRICAN.)

Bombyliidæ.

Systropus snowi Adams.

Syrphidæ.

Melanostoma bituberculata Adams.
Eristalis longicornis Adams.
aequalis Adams.
communis Adams.
dissimilis Adams.

Conopidæ.

Conops fumipennis Adams.
bellus Adams.
semifumosus Adams.

Muscidæ.

Paracompsomyia houghi Adams.
splendida Adams.
verticalis Adams.

Sciomyzidæ.

Sepedon ornatifrons Adams.
scapularis Adams.

Diopsidæ.

Diopsis affinis Adams.
nitidus Adams.
pollinosus Adams.

CONTENTS OF MUSEUM.

	Number of species varieties in regular named collections.	Number of specimens in regular named collections.
North American Coleoptera	8,089	35,052
" " Lepidoptera	3,756	12,208
" " Diptera	2,244	6,741
" " Hymenoptera	1,304	3,912
" " Hemiptera	1,064	3,724
" " Orthoptera	492	1,845
" " Neuroptera	293	.....
Exotic Coleoptera	2,600	8,450
" Lepidoptera	981	1,716
Collections for studies in geographic distribution, variations and economic problems	.....	182,000
Grand totals	20,803	255,640
Grand total in Museum		276,451

SUMMARY OF TYPES IN SNOW ENTOMOLOGICAL COLLECTIONS.

Neuroptera	1
Orthoptera	15
Hemiptera	45
Coleoptera	12
Diptera	490
Lepidoptera	100
Hymenoptera	258
African Diptera	25
Total	946

What the University, Through its Department of Entomology, is Doing for the State.*

1. *For the State in General.*
2. *For Each One of the 105 Counties in Particular.*

FOR THE STATE.

1. Extended investigations in alfalfa culture and insect life, with special reference to native grasshoppers.

2. Increased alfalfa yield one-third by methods of culture devised by this department and now uniformly used over the entire state.

3. Demonstrated that bees largely increase the alfalfa seed yield.

4. Four thousand copies of manual, fully illustrated, on bee culture and management, distributed free over the state.

5. Fifteen thousand copies of directions for dealing with injurious grasshoppers, distributed over the state.

6. Eight thousand fully illustrated bulletins on alfalfa culture distributed over the state.

7. Eight thousand nine hundred and thirty-two boxes of green-bug parasites distributed over the state, a check to the inroads of this most destructive wheat insect.

8. Fifteen thousand bulletins, fully illustrated, on the green bug and how to control it by proper culture and use of parasites. Assisted by Professor Glenn and advanced students.

9. Ten thousand bulletins, fully illustrated, on insects most injurious to fruit trees, with Professor Headlee of the Agricultural College.

10. Two thousand circulars of detailed information dealing with special current problems.

11. Detailed survey of orchards, 1,142,466 trees, in seven counties, and the directions given owners for their management.

12. Investigations looking toward control of woolly aphis and crown gall, two of the most serious menaces to the nursery business.

13. Eradication of San José scale from seven counties.

14. Directed, in the past two years, 1910-'12, work of spraying 162,585 fruit trees.

15. Annual examination of nursery stock, making possible its sale and shipment.

16. Inspection of all imports of nursery stock from foreign countries. In this there has been detected and destroyed about 5000 brown-tail moths, an insect which is costing some of the eastern states in remedial measures thousands of dollars annually.

17. Survey each spring of wheat areas to detect presence of green bug. This at the request of the millers and grain men.

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* At the close of each biennium the Department is called upon for this information, and it has accordingly been deemed advisable to place this data here in permanent form for future reference. Since 1907 the activities of the Department along economic lines, in accordance with the assignment of the Kansas State Entomological Commission, has been confined to the southern half of the state.

18. Furnishing high schools with mounted collections without cost.

19. Detailed survey of insect life of thirty-five counties. Distinguishing the beneficial from the injurious. Assisted by Mr. F. X. Williams and advanced students.

20. In past fifteen years, performed entomological work of practical value in 105 counties.

21. State entomologist, entomologist to Kansas State Board of Agriculture. Entomologist to Kansas State Board of Horticulture, honorary member of Western Association of Nurserymen.

22. Addresses before various state societies on problems of economic value.

23. Answer from 5000 to 8000 letters annually to citizens of the state, giving information sought by them.

24. Federal act of August 20, 1912, requires all importations of trees, plants, shrubs, bulbs, etc., to be inspected at point of destination by properly authorized state authority. This department performs this service for the south half of the state.

25. Extended investigation on probable cause of the human disease pellagra.

26. Chairman of University research commission on the horse plague. The results of this work were to locate the cause in improperly cured forage, and to demonstrate conclusively that a change to properly cured forage eliminated the disease. At the time when the University undertook this work there were many theories advocated regarding the cause, and now practically all investigators engaged on the problem agree with the University's diagnosis.

27. Construction of federal legislation in interest of horticulture, and assistance in passage of same. For some ten years the federal authorities and horticultural interests had been unable to agree on federal legislation to protect this country against importations of foreign pests. There is now a federal statute, and Kansas has proper protection thereby. Two trips were made to Washington and frequent conferences held with the members of House Committee on Agriculture in connection with this work.

28. The large problems which concern the state from time to time, such as the native grasshoppers, chinch bugs, Hessian fly, green bug, and codling moth, as the preceding pages show from year to year during the past forty years as occasion required, have been the subject of special investigations by the department.

For example, in the year 1913 the department coöperated with county commissioners in the distribution of 170 tons of the dry poison for the extermination of grasshoppers.

FOR THE STATE, ARRANGED BY COUNTIES.

Allen County.

Eradicated infestation of San José scale.

Made examination and certified to the healthy condition of about $5000 worth of nursery stock during one year.

Distributed green-bug parasite.

Anderson County.

Directed the treatment of insects injurious to forest trees.

Distributed green-bug parasite.

Inspected nursery stock.

Conducted experimental work on chinch bug.

Atchison County.

Distributed green-bug parasites.

Made examination of the orchards with reference to a serious outbreak of apple blight, and reported same to the United States Department of Agriculture.

Barber County.

Made examination and certified to the healthy condition of about $5000 worth of nursery stock each year.

Distributed green-bug parasites.

Barton County.

Made annual examination and certified to the healthy condition of about $15,000 worth of nursery stock during the last eight years.

Established and maintained a distributing station for the distribution of the green-bug parasite.

Made a detailed survey of the insect life of the county.

Gave individual assistance to farmers in fighting grasshoppers.

Bourbon County.

Made annual examination and certified to the healthy condition of about $75,000 worth of nursery stock at four points during each of the last ten years, making possible its sale and shipment.

Distributed green-bug parasites.

Investigations of the sand fly with reference to its connection with the distribution of pellagra.

Brown County.

Made examination of orchards with reference to serious outbreak of apple blight, and reported same to the United States Department of Agriculture.

Distribution of green-bug parasites.

Butler County.

Distribution of green-bug parasites.

Chase County.

Distribution of green-bug parasites.

Chautauqua County.

Distribution of green-bug parasites.

Cherokee County.

Made annual examination and certified to the healthy condition of about $5000 worth of nursery stock during each of the last two years.

Distribution of green-bug parasites.

Cheyenne County.

Made a detailed study of insect life, with special reference to the species injurious and beneficial to agriculture, requiring the time of four men for one year.

Clark County.

Made a detailed survey of the insect life, with special reference to the species injurious and beneficial to agriculture.

Distribution of green-bug parasites.

Clay County.

Distribution of green-bug parasites. Special green-bug investigation conducted here.

Cloud County.

Made examination of orchards, with reference to a serious outbreak of apple blight, and reported same to United States Department of Agriculture.

Distribution of green-bug parasites.

Coffey County.

Made annual examination and certified to the healthy condition of about $30,000 worth of nursery stock during each of the last ten years, enabling the owner to offer same for sale and shipment.

Inspection of orchards and shade trees.

Distribution of green-bug parasites.

Comanche County.

Distribution of green-bug parasites.

Cowley County.

Made annual examinations and certified to the healthy condition of about $400,000 worth of nursery stock during each of the last sixteen years.

Distribution of green-bug parasites.

Crawford County.

Made annual examination and certified to the healthy condition of about $40,000 worth of nursery stock at three points during each of the last eight years, making possible its sale and shipment.

Distribution of green-bug parasites.

Survey of orchard and forest trees and advising owners as to methods of treatment.

Decatur County.

Made demonstrations of the value of the disc harrow in alfalfa culture, increasing thereby the alfalfa yield one-third.

Made detailed survey of insect life, with special reference to species injurious and beneficial to agriculture.

Distribution of green-bug parasites.

Dickinson County.

Made annual examination and certified to the healthy condition of about $10,000 worth of nursery stock during each of the last eight years.

Distribution of green-bug parasites.

Doniphan County.

Made examination of the orchards with reference to a serious outbreak of apple blight, and reported same to the United States Department of Agriculture.

Distribution of green-bug parasites.

Douglas County.

Made annual examination and certified to the healthy condition of about $300,000 worth of nursery stock at five different points, during each of the last sixteen years.

Eradicated a serious infestation of San José scale.

Detected of foreign importations seven nests, amounting to about 1500 of the brown-tail moth.

Erected an inexpensive plant for the manufacture of orchard sprays, demonstrating to farmers their independence of any spray manufacturing concern.

Took immediate charge of the spraying and management of one orchard and directed the work in two other large orchards.

Demonstrated in experimental orchard the efficacy of sprays in producing sound fruit and in increasing yield and market value of orchards.

Edwards County.

Established and maintained for many years experiment station for the exclusive study of alfalfa culture and insect life, with special reference to grasshoppers.

Developed and established on a firm basis the cultural value of the disc harrow in the production of alfalfa.

Demonstrated that disking and cross-harrowing in the spring increased the alfalfa yield about one-third.

Made annual examination and certified to the healthy condition of about $5000 worth of nursery stock during each of the last seven years.

The department here profited by the coöperation of Professor Dean, of the Agricultural College, in campaign against the grasshopper.

Elk County.

Distribution of green-bug parasites.

Ellis County.

Distribution of green-bug parasites.

Made detailed survey of insect life of the county, with special reference to species injurious and beneficial to agriculture.

Ellsworth County.

Distribution of green-bug parasites.

Finney County.

Conducted experiments with reference to the part played by bees in the production of alfalfa seed.

It was shown that bees increased the alfalfa seed yield fully two-thirds.

It was further shown that alfalfa was the best honey-producing plant in the state.

Survey of orchard and forest trees and direction of means of taking proper care of them.

Survey of the insect life of the county with special reference to the species injurious and beneficial to agriculture.

Distribution of green-bug parasites.

Coöperated with county commissioners in campaign against grasshoppers. Distributed poison—4000 pounds Paris green and 40 tons bran.

Ford County.

An extended demonstration through three seasons proved the value of the disc harrow in the production of alfalfa.

A detailed survey of the shade and fruit trees of Dodge City, and the direction of the necessary spraying of the trees infested with San José scale.

Annual examination, without cost to the state, at the State Forestry Station.

Survey of the insect life of the county.

Coöperated with county commissioners in campaign against grasshoppers. Distributed 4500 pounds Paris green, 45 tons bran. The department profited here by the coöperation of Professor Dean, of the Agricultural College, the Santa Fe and the U. S. Department of Agriculture.

Franklin County.

Made annual examination and certified to the healthy condition of about $350,000 worth of nursery stock during each of the last sixteen years, enabling owners to offer same for sale and shipment.

Prepared 4500 gallons of spray for one orchardist.

Examined some fifteen shipments of foreign importations of nursery stock, detecting thereon and destroying twenty-seven nests of the brown-tail moth, amounting in all to 5000 insects so highly destructive to forest and fruit and shade trees.

Fumigated about $40,000 worth of nursery stock.

Made detailed survey of fruit and shade trees and advised concerning methods of caring for them.

Investigations of sand-fly distribution with reference to its connection with the dissemination of pellagra.

Geary County.

Distribution of green-bug parasites.

Gove County.

Made a detailed study of insect life with special reference to the species beneficial and injurious to agriculture, requiring the entire time of four men during the entire season.

Graham County.

The extended demonstration through three seasons proved the value of the disc harrow in the production of alfalfa.

Distribution of green-bug parasites.

Study of the insect life with special reference to species beneficial and injurious to agriculture.

Grant County.

Made a detailed study of insect life with special reference to species beneficial and injurious to agriculture.

Gray County.

Distribution of green-bug parasites.

Coöperated with county commissioners in campaign against grasshoppers. Distributed poison—1700 pounds Paris green, 17 tons bran.

Greeley County.

Made a detailed study of insect life with special reference to species injurious and beneficial to agriculture, requiring the entire time of four men during a part of the year and of two men the entire season.

Greenwood County.

Made annual examination and certified to the healthy condition of about $25,000 worth of nursery stock during each of the last six years.

Distribution of green-bug parasites.

Hamilton County.

Maintained and established a station for five years, dealing with alfalfa culture and insect life, with special reference to native grasshoppers, increasing thereby the alfalfa yield one-third.

Demonstrated that bees were not only profitable for honey, but also for their part in increasing the alfalfa-seed yield fully two-thirds.

Gave individual assistance to the farmers in fighting grasshoppers.

Harper County.

Eradicated infestation of San José scale.

Distribution of green-bug parasites.

Harvey County.

Made annual examination and certified to the healthy condition of about $25,000 worth of nursery stock during each of the last sixteen years.

Corrected false report sent out by agent of Department of Agriculture on infestation of San José scale. This report, if allowed to stand, would have brought about great pecuniary loss to the nurserymen.

Distribution of green-bug parasites.

Haskell County.

Distribution of green-bug parasites.

Made detailed study of the insect life, with special reference to the species injurious and beneficial to agriculture.

Hodgeman County.

Distribution of green-bug parasites.

Coöperated with county commissioners in campaign against grasshoppers. Distributed poison—1000 pounds Paris green, 10 tons bran.

Jackson County.

Made annual examination and certified to the healthy condition of about $15,000 worth of nursery stock during each of the last twelve years.

Study of sand-fly distribution, with reference to its possible connection with the dissemination of pellagra.

Distribution of green-bug parasites.

Jefferson County.

Field laboratory for green-bug investigation.

Distribution of green-bug parasites.

Direction of work on orchard culture.

Jewell County.

Distribution of green-bug parasites.

Kept a man in the field directing work against the green bug.

Johnson County.

Owner of large young orchard at Lenexa asked the department to assume direction of its scientific management, and this the department did.

Distribution of green-bug parasites.

Kearny County.

Distribution of green-bug parasites.

Study of insect life, with special reference to species injurious and beneficial to agriculture.

Coöperated with county commissioners in campaign against grasshoppers. Distributed poison—2500 pounds Paris green, 25 tons bran.

Kingman County.

Distribution of green-bug parasites.

Inspection of nursery stock annually, making possible its sale and shipment.

Inspection of shade and fruit trees for San José scale.

Kiowa County.

Established and maintained a field station for the distribution of the green-bug parasite.

Labette County.

Eradicated San José scale, the most serious menace to horticulture in one portion of the county.

Made detailed examinations of shade and fruit trees at Parsons, and directed spraying with the purpose of eradicating this scale from the city.

Made annual examination and certified to the healthy condition of about $300,000 worth of nursery stock at three points during each of the last twelve years, making possible its sale and shipment.

Investigation of sand fly, with reference to its connection with the transmission of pellagra.

Lane County.

Made a detailed study of insect life, with special reference to species injurious and beneficial to agriculture, requiring the entire time of four men during the entire summer.

Distribution of green-bug parasites.

Gave individual assistance to the farmers in fighting grasshoppers.

Leavenworth County.

Made annual examination and certified to the healthy condition of about $40,000 worth of nursery stock during the last ten years.

Distribution of green-bug parasites.

Lincoln County.

Distribution of green-bug parasites.

Linn County.

Made annual examination and certified to the healthy condition of about $40,000 worth of nursery stock, making possible its sale and shipment.

Made annual examination and certified to the healthy condition of about $2000 worth of greenhouse stock, enabling owner to offer same for sale and shipment.

Distribution of green-bug parasites.

Inspected orchards and advised owners as to methods of culture and management.

Logan County.

Made a detailed study of the insect life with special reference to species injurious and beneficial to agriculture.

Distribution of green-bug parasites.

Lyon County.

Made annual examination and certified to the healthy condition of about $10,000 worth of nursery stock during the last six years.

Distribution of green-bug parasites.

Marion County.

Made annual examination and certified to the healthy condition of about $10,000 worth of nursery stock during each of the last sixteen years.

Established and maintained an experiment station on green bug and other insects damaging the wheat.

Marshall County.

Made examinations of orchards with reference to a serious outbreak of apple blight and reported same to the United States Department of Agriculture.

Distribution of green-bug parasites.

McPherson County.

Made annual examination and certified to the healthy condition of about $5000 worth of nursery stock during each of the last four years.

Distribution of green-bug parasites.

Meade County.

Distribution of green-bug parasites.

Study of the distribution of sand fly in its connection with the possible transmission of pellagra.

Study of insect life with special reference to species injurious and beneficial to agriculture.

Coöperated with county commissioners in campaign against grasshoppers. Distributed poison—1500 pounds Paris green, 30,000 pounds bran.

Miami County.

Distribution of green-bug parasites.

Mitchell County.

Kept a man in the field directing work against the green bug.

Montgomery County.

Made annual examination and certified to the healthy condition of about $10,000 worth of nursery stock at two points during each of the last ten years.

Study of the sand fly with its possible connection with the transmission of pellagra.

Survey of orchards and shade trees, giving advice as to methods of culture and management.

Distribution of green-bug parasites.

Morris County.

Made annual examination and certified to the healthy condition of about $40,000 worth of nursery stock during the last eight years.

Directed the spraying of a 125-acre orchard during three years.

Distribution of green-bug parasites.

Morton County.

Made special study of insect life with special reference to species injurious and beneficial to agriculture.

Nemaha County.

Made examination of orchards with reference to serious outbreak of apple blight, and reported same to United States Department of Agriculture.

Made annual examination and certified to healthy condition of about $6000 worth of nursery stock during each of the last twelve years.

Distribution of green-bug parasites.

Neosho County.

Made annual examination and certified to healthy condition of about $50,000 worth of nursery stock during each of the last twelve years, enabling the owner to make sale and shipment.

Distribution of green-bug parasites.

Survey of shade trees and fruit trees and direction of methods for control of tent caterpillar pest.

Ness County.

Investigation of horse plague in western Kansas.

Study of insect life with special reference to species injurious and beneficial to agriculture.

Distribution of green-bug parasites.

Gave individual assistance to the farmers in fighting grasshoppers.

Norton County.

The extended demonstration through three seasons proved the value of the disc harrow in the production of alfalfa.

Distribution of green-bug parasites.

Study of the insect life with special reference to species injurious and beneficial to agriculture.

Osage County.

Distribution of green-bug parasites.

Osborne County.

Distribution of green-bug parasites.

Study of insect life with special reference to species injurious and beneficial to agriculture.

Ottawa County.

Distribution of green-bug parasites.

Pawnee County.

A detailed survey in the city of Larned of shade and fruit trees, and directing the spraying of the area.

Distribution of green-bug parasites.

Phillips County.

Kept a man in the field directing work against green bug.

Pottawatomie County.

Distribution of green-bug parasites.

Pratt County.

Eradicated infestation of San José scale.

Made examination of and certified to healthy condition of about $5000 worth of nursery stock.

Distribution of green-bug parasites.

Study of insect life with special reference to species injurious and beneficial to agriculture.

Gave individual assistance to the farmers in fighting grasshoppers.

Rawlins County.

Made a detailed study of insect life with special reference to species beneficial and injurious to agriculture.

Distribution of green-bug parasites.

Republic County.

Distribution of green-bug parasites.

Made examination of orchards with reference to serious outbreak of apple blight, and reported same to the United States Department of Agriculture.

Reno County.

Made detailed examination of the orchards.

Directed spraying of infested orchards until, as far as our observation goes, the San José scale has been eradicated from that county.

Made annual examination and certified to the healthy condition of about $10,000 worth of nursery stock during the last six years.

Distribution of green-bug parasites.

Rice County.

Distribution of green-bug parasites.

Riley County.

Distribution of green-bug parasites.

Rooks County.

Distribution of green-bug parasites.

Study of insect life with special reference to species beneficial and injurious to agriculture.

Rush County.

Made a detailed survey of insect life with special reference to species beneficial and injurious to agriculture.

Distribution of green-bug parasites.

Russell County.

Distribution of green-bug parasites.

Saline County.

Distribution of green-bug parasites.

Scott County.

Study of insect life, with special reference to species injurious and beneficial to agriculture.

Distribution of green-bug parasites.

Coöperated with county commissioners in campaign against grasshoppers. Distributed poison—1000 pounds arsenic, 10 tons bran.

Sedgwick County.

A detailed examination of ten townships, giving specific directions to owners in each case on the best methods of orchard management, amounting in all to 305,082 fruit trees. Out of this number 52,032 were sprayed.

Made annual examination and certified to the healthy condition of about $45,000 worth of nursery stock during each of the last ten years.

Examined four large greenhouse plants during the last six years, making possible the sale and shipment of their goods.

Fumigated annually about $10,000 worth of stock during the last six years.

Distribution of green-bug parasites.

Seward County.

Study of insect life, with special reference to species injurious and beneficial to agriculture.

Shawnee County.

Eradicated infestation of San José scale.

Made annual examination and certified to the healthy condition of about $500,000 worth of nursery stock at seven different points during each of the last sixteen years.

Fumigated about $30,000 worth of nursery stock, enabling owners to ship same into states requiring such treatment.

Examined a large number of importations of foreign nursery stock, and destroyed thereon about 6000 brown-tail moths.

Distribution of green-bug parasites.

Sheridan County.

Study of insect life, with special reference to species beneficial and injurious to agriculture.

Distribution of green-bug parasites.

Sherman County.

Study of insect life, with special reference to species beneficial and injurious to agriculture.

Smith County.

Study of insect life, with special reference to species beneficial and injurious to agriculture.

Distribution of green-bug parasites.

Stafford County.

Established and maintained a distributing station for the distribution of green-bug parasites.

Gave individual assistance to the farmers in fighting grasshoppers.

Stanton County.

Study of the insect life, with special reference to species beneficial and injurious to agriculture.

Stevens County.

Study of insect life, with special reference to species beneficial and injurious to agriculture.

Distribution of green-bug parasites.

Sumner County.

Made annual examination and certified to the healthy condition of about $150,000 worth of nursery stock at four different points during each of the last fourteen years.

Distribution of green-bug parasites.

Thomas County.

Made a detailed study of insect life, with special reference to species injurious and beneficial to agriculture, requiring the entire time of four men during the entire season.

Distribution of green-bug parasites.

Trego County.

Study of insect life, with special reference to species beneficial and injurious to agriculture.

Distribution of green-bug parasites.

Wabaunsee County.

Distribution of green-bug parasites.

Wallace County.

Made a detailed study of insect life, with special reference to species beneficial and injurious to agriculture.

Washington County.

Made examination of orchards with reference to a serious outbreak of apple blight, and reported same to the United States Department of Agriculture.

Distribution of green-bug parasites.

Wichita County.

Made a detailed study of insect life, with special reference to species injurious and beneficial to agriculture, requiring the time of four men during the entire season.

Distribution of green-bug parasites.

Gave individual assistance to the farmers in fighting grasshoppers.

Wilson County.

Distribution of green-bug parasites.

Examination of fruit and shade trees and direction of methods for care and management.

Woodson County.

Distribution of green-bug parasites.

Wyandotte County.

Made annual examination and certified to the healthy condition of about $125,000 worth of nursery stock during each of the last sixteen years, making possible its sale and shipment.

Fumigated about $75,000 worth of nursery stock in order that same might be sold.

Made detailed examination of the conditions of all orchards, 125 in number, amounting to 129,422 fruit trees, in Shawnee township, giving explicit directions to the owners in each case on profitable management.

Held two public spraying demonstrations in larger orchards, which were attended by over 300 horticulturists, some coming from other counties. At these demonstrations the fruit-growers were shown how to make and apply the various sprays.

Distributed over 1000 bulletins on orchard spraying.

Directed the work of spraying 35,000 fruit trees.

Distribution of green-bug parasites.

Total number of counties	105
Total number of items	240

Some of the Graduates of the University

WHO TOOK THEIR MAJOR WORK IN THE DEPARTMENT OF ENTOMOLOGY.

Adams, C. F., Director and Entomologist of Arkansas Agricultural and Mechanical College, Fayetteville, Ark.

Aldrich, J. M., Entomologist, U. S. Department Agriculture.

Andrews, Orrel M., Science Illustrator, Illinois State University, Urbana, Ill.

Burrows, M. T., Professor Department Pathology, Medical School, Cornell University, Ithaca, N. Y.

Claassen, P. W., Assistant State Entomologist on Kansas Entomological Commission, Southern Division.

Crumb, Ebb. S., Member Staff of U. S. Entomologist.

Emery, W. T., Investigator for State Board of Health.

Glenn, P. A., Chief Inspector, Office of State Entomologist, Urbana, Ill.

Hungerford, H. B., Assistant Professor in Entomology, Kansas University.

Hunter, S. J., Head of Department of Entomology, University of Kansas. State Entomologist, Southern Division.

Hosford, Ruby, Assistant in Laboratory and State Work, University of Kansas.

Isely, Dwight, Holder Schuyler Fellowship in Entomology at Cornell University, Ithaca, N. Y. 1913-'14.

Kellogg, V. L., Professor of Entomology and Binomics, Leland Stanford University.

McDaniel, Eugenia, Instructor in Entomology, Michigan Agricultural College.

Meek, W. J., Associate Professor of Physiology, Wisconsin University.

Palmer, Miriam, Instructor in Entomology, Colorado Agricultural College, Fort Collins.

Parrott, P. J., Entomologist New York Experiment Station, Geneva, N.Y.

Sanborn, C. E., Head of Department of Entomology, Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

Scheffer, T. H., Member Staff of United States Biological Survey.

Spangler, A. J., Chief Inspector, Minnesota State Nursery and Orchard Inspection Service, State Experiment Station, St. Anthony Park, Minn.

Weeks, Ella, Biological Artist, Kansas Agricultural College.

The above list does not include those graduates who took their majors in the department and are now practicing physicians and teachers of science in high schools.

Publications of Department of Entomology.

Adams, C. F.

1. 1903—Dipterological Contributions; K. U. Science Bul., vol. II, No. 2.
2. 1904—Notes on and Descriptions of North American Diptera; K. U. Science Bul., vol. II, No. 14.
3. ———Descriptions of Six New Species of Diptera of Kansas; K. U. Science Bul., vol. II, No. 5.
4. 1905—Diptera Africana, part I; K. U. Science Bul., vol. III, No. 6.

Aldrich, J. M.

5. 1892—A new Genus and Species of Tabanidæ; Psyche, pp. 236, 237; 1 fig.
6. ———A New Species of Phora; Canadian Entomologist, pp. 142-146.
7. ———The Systematic Position of the Diptera; Science, New York.
8. ———Revision of the Genera Dolichopus and Hygroceleuthus; K. U. Science Quarterly, pp. 1-26; 1 pl.
9. ———New Genera and Species of Psiloponæ; K. U. Science Quarterly, pp. 47-50.
10. ———The Dolichopodid Genus Liancalus Loew; Psyche, pp. 569-571.
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13. 1895—The Tipulid Genera Bittacomorpha and Pedicia; Psyche, pp. 200-202; 1 fig.
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15. ———The Dipterous Genera Tachytrachus and Macellocerus; Trans. Amer. Ent. Soc., pp. 81-84.
16. ———On the Diptera of St. Vincent (Dolichopodidæ and Phoridæ); Trans. Ent. Soc. Lond., pp. 309-345 and 435-439.
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Branch, Hazel E.

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Brown, Barnum.

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GAUMER, GEORGE F.

22. 1875—Observations on the Habits of Certain Larvæ; Trans. Kans. Acad. Sci., IV, pp. 22-24.

GLENN, P. A.

23. 1909—The Influence of Climate upon the Green Bug and its Parasites; Univ. of Kansas Bul., vol. IX, No. 2, pp. 165-200.

HOSFORD, RUBY C.

24. 1913—The Study on the Segmentation of the Head of Insects; pls. I-IV, this Journal.

HUNGERFORD, H. B.

25. 1912—Biological Notes on Some Kansas Hymenoptera; Ent. News, vol. XXIII, June, pp. 241-261; pls. 14, 15, 16 (with Williams).
26. ———Orchard Problems and How to Solve Them; Circular No. 3.
27. 1913—The Success of a Two-spray Calendar in a Kansas Orchard; Jour. Economic Ent., April, pp. 165-173.

HUNTER, S. J.

28. 1892—The Corn-root Worm, Diabrotica longicornis Say; Trans. Kan. Acad. Sci., XIII, pp. 131-133.
29. 1893—Insects Injurious to Drugs; Proc. Kans. Pharm. Assoc., pp. 99-102 (with L. E. Sayre); Amer. Jour. Pharm., July, 1893.
30. 1896—Notes on Injurious Insects; Trans. Kans. Acad. Sci., XV, pp. 50-53.
31. 1897—The More Destructive Grasshoppers of Kansas; Bul. Dept. of Entom., Oct., pp. 1-111, pls. I-IV (with F. H. Snow).
32. 1898—Scale Insects Injurious to Orchards; Bul. Dept. Entom., pp. 1-62, figs. 1-7.
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40. 1899—Fertilization of the Alfalfa Blossom by Bees; Quart. Report Kansas State Bd. Agric., March, pp. 219-223, 3 figs.
41. ———The Nurseryman and the Entomologist; 24th Proc. Amer. Assoc. Nurserymen, pp. 28-34.
42. ———The Commotion in Kansas and Missouri upon the Appearance of Dissosteira in Colorado; Psyche, VIII, pp. 384-386.

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44. 1900—Coccidæ of Kansas, III; K. U. Quart., vol. IX, No. 2, pp. 101-107, pls. XVIII-XXIV.
45. ———Alfalfa Culture and Insect Life; Quart. Rep. Kans. St. Bd. Agric., March, pp. 41-51, 5 pls., 3 figs.
46. ———Some Entomological Problems in Horticulture; Rep. Colo. St. Bd. Hort., vol. XI (1899-1900), pp. 54-57, 66-69.
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48. ———The Melanopli of Kansas, part II; Psyche, vol. IX, pp. 76-78, July, 1900 (with W. S. Sutton).
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53. ———Selection, Natural and Artificial; Western Fruit Grower, Oct. 1901, pp. 12, 13.
54. 1902—Elementary Studies in Insect Life (a textbook); 369 pages, 264 illustrations, April, 1902.
55. 1903—The Coccidæ of Kansas (a text for students in taxonomy); 120 pages, 15 plates, August, 1903.
56. ———On the Condition Governing the Production of Artificial Parthenogenesis in Arbacia; Biol. Bul., vol. V, No. 3, Aug.
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ISELY, DWIGHT.

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KELLOGG, V. L.

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86. ———Insects Injurious to Drugs; Proc. 13th Ann. Meet. Kans. Pharm. Assoc., pp. 105-110 (with L. E. Sayre).
87. ———Notes on Melitera dentata Grote; K. U. Quart. No. 1, pp. 39-41.
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90. ———The Destruction of Insects by Fungi; Trans. St. Hort. Soc. of Calif. for 1893, pp. 29-32.
91. 1894—The Taxonomic Value of the Scales of the Lepidoptera; K. U. Quart., II, pp. 45-89, 17 figs., 2 pls.

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93. ———An European Experiment with Insect Diseases; Third Ann. Rep. Kans. Univ. Exper. Sta., pp. 227-339.
94. ———Insects Injuring Drugs at the University of Kansas; Insect Life, VII, pp. 31-32.
95. ———Notes on the Elementary Comparative External Anatomy of Insects; pp. 1-20.
96. 1903—Two New Genera of Mallophaga; Biol. Bul. of Marine Biol. Lab., vol. 5, No. 2.

LOHRENZ, H. W.

97. 1911—The Woolly Aphis, Schizoneura lanigera; Jour. Ec. Ent., vol. IV, April, pp. 162-172.

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98. 1903—On the Mouth Parts of the Hemiptera; K. U. Sci. Bul., vol. II, No. 9.

PALMER MIRIAM.

99. 1905—On the Dorsal Glands as Characters of Constant Specific Value in the Coccid Genus Parlatoria; K. U. Sci. Bul., vol. III, No. 5.

SANBORN, CHAS. EMERSON.

100. 1904—Kansas Aphididæ, with Catalogue of North American Aphididæ and Host-plant List; K. U. Sci. Bul., vol. III, No. L.
101. 1906—Kansas Aphididæ, with Catalogue of North American Aphididæ and Host-plant and Plant-host List, part II; K. U. Sci. Bul., vol. III, No. 8.

SCHEFFER, THEOPHILUS H.

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103. 1875—The Rocky Mountain Locust, Caloptenus spretus Uhler; Trans. Kans. Acad. Sci., IV, pp. 26-28.
104. ———The Larva and Chrysalis of the Sage Sphinx, Sphinx lugens Walker (eremitoides Streckerr); Trans. Kans. Acad. Sci., IV, pp. 28, 29.
105. ———Catalogue of the Lepidoptera of Eastern Kansas; Trans. Kans. Acad. Sci., IV, pp. 29-59 (503 species enumerated).
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111. ———List of Lepidoptera Collected in Colorado in June, July and August by the Kansas University Scientific Expedition; Trans. Kans. Acad. Sci., VI, 70-75 (enumerates 104 species).
112. ———List of Coleoptera Collected Near Dome Rock, Platte Canyon, Colorado, by the Kansas University Scientific Expedition; Trans. Kans. Acad. Sci., VI, pp. 75, 76 (enumerates 94 species).
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114. ———List of Coleoptera Collected in Santa Fe Canyon, N. M., by the Kansas University Scientific Expedition; Trans. Kans. Acad. Sci. VII, pp. 70-73 (enumerates 237 species).
115. ———Douglas County Additions to the List of Kansas Coleoptera in 1879-'80; Trans. Kans. Acad. Sci., VII, pp. 78-79 (enumerates 144 species).
116. ———Preliminary List of the Hymenoptera of Kansas; Trans. Kans. Acad Sci., pp. VII, pp. 97-101 (enumerates 186 species).
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118. ———Larva of Eurycreon rantalis Guen. (Web-worm); Psyche, III, p. 127.
119. 1881—List of Lepidoptera and Coleoptera Collected in New Mexico by the Kansas University Scientific Expedition; Trans. Kans. Acad. Sci., VIII, pp. 35-46 (315 species Lepidoptera, 53 sp. nov.; 514 Coleoptera, 17 sp. nov.).
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123. 1883—Three Noxious Insects—The Forest Handmaid Moth, the Maple Worm, and the Codling Moth; Second Quarterly Report Kans. St. Bd. Agric., pp. 93-101.
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157. ———Lists of Coleoptera and Lepidoptera Collected in Hamilton, Morton and Clark Counties, Kansas, in 1902 and 1903; K. U. Sci. Bul., vol. II, No. 4, June, 1904.
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SNOW, W. A.

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169. ———Diptera of Colorado and New Mexico; K. U. Quart., III, pp. 225-247.
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171. ———Cnephalia and Its Allies; K. U. Quart., III, pp. 178-186.
172. ———A New Species of Pelecocera; K. U. Quart., III, p. 187.
173. ———On Toxoteypana of Gerstacker; K. U. Quart., IV, pp. 117-119.
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STOUGH, HOWARD B.

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SUTTON, W. S.

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